

Management of Similipal Biosphere Reserve Forest

Issues and Challenges

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Abstract

The conservation of biodiversity has been a contentious and complex issue over the years. Protected areas [PAs] that are created to preserve biodiversity are in critical condition due to excessive anthropogenic pressure. The Similipal biosphere reserve [SBR] in the Odisha state of India is the sixth largest biosphere reserve in the country and forms a major part of the World Network of Biosphere Reserves. SBR is the home for diverse flora and fauna and most of them are endemic in nature. Besides the rich floral and faunal biodiversity, SBR is also the abode of many tribes living in and around the biosphere reserve and critically depend on the reserve for livelihoods. Designing appropriate and effective local institutions that fosters biodiversity conservation and livelihoods is widely considered as a panacea for this problem. The paper describes the current issues and challenges faced by the SBR; analyzes how the local institutions are functioning and demonstrates how management interventions can be effectively and equitably prioritized towards the members of a community who are mostly dependent on forest resources in order to promote sustainable local livelihoods and biodiversity conservation. Lessons learned include the capacity building training activities to raise the skill and capabilities of the stakeholders through joint government-community collaboration; sharing of benefits in equitable way among the shareholders; empowerment of local people through better participatory programmes; and provision of well-defined livelihood enhancement opportunities through promotion of eco-tourism which is highly neglected in SBR.

Keywords

Forest; Management; Biodiversity Conservation; Institutions; Livelihoods; Odisha; India

Introduction

The continued loss of biodiversity has forced researchers and policy makers across the globe to rethink on the existing natural resource management practices and explore alternative approaches that are

effective in preventing further ecosystem degradation and species extinctions and at the same time promote sustainable resource use [1]. In recent years, many scientific reports have pointed out that the loss of biodiversity (in terms of the extinction of species) has increased dramatically due to increasing human intervention in the natural environment [2, 3]. Species are estimated to be disappearing at a rate more than a thousand times faster than is known historically [4]. This loss of species threatens the availability of essential ecosystem services that are vital for the survival of human communities. In an attempt to address this situation, governments across the world have adopted conservation policies by creating natural habitats such as Protected Areas (PAs) in the form of biosphere reserves, wildlife sanctuaries, and national parks, for conserving biodiversity that is threatened or critically endangered. The importance and relevance of these PAs lies in the conservation of key biological resources along with the scope for sustainable development initiatives that will strengthen local livelihoods. However, currently the PAs are facing numerous challenges and are in critical and threatened condition.

Across the PAs a variety of issues has surfaced over the last few years, including conflicts between local people and forest department officials, between local people and commercial forces, and between conservationists and commercial forces [5]. The establishment of PAs in developing countries has placed heavy burden on local communities and this has proved to be a severe barrier to effective conservation [2, 3]. It has been seen that any attempt at Wildlife conservation has to accept the harsh reality of rapidly increasing human population living below the poverty line for whom basic need satisfaction is a biggest challenge [5, 6].

The main issue is the exercising of the customary rights of local people to use land and park resources; this raises basic questions about the survival of local communities and achieving park objectives [7, 5]. This has put a direct impact on their survival and livelihood base and refrain them even from the basic inputs like NTFPs, cooking energy and fodder for livestock [8, 9]. Again, eviction of local traditional communities is often regarded as an extreme social outcome of biodiversity conservation which has the unintended consequence of displacing people and cutting them off from their principal source of economic livelihood [9, 6, 10, 11, 12]. Ref. [13]¹ has pointed out that in most of the cases the consequences of displacement and exclusion results in various environmental problems and socio-economic conflicts. Besides, the strict conservation rules many times results in an increase in the population of some species like elephant, tiger, lions, leopards etc. in some areas which has a spill-over effect of animals not finding adequate food and space to roam freely [5].

However, many times the legal status, rather than the conservation priorities put challenges and creates conflicts in many PAs. Study finds that even from a scientific point of view, the creation of national parks and sanctuaries in many developing countries has been highly irrational [5]. Although some areas in these countries have large wildlife value but they have not been assigned the PA status, whereas, a number of PAs having limited ecological value and largely degraded ecosystems are enjoying the status by depriving benefits to the large human population residing inside these areas [ibid]. Besides, many times the PA status are taken not only ignoring the human factors, but also scientifically unsound².

Since the park-people relationship is always two-way, conflicts are inevitable because of the presence of multiple stakeholders with differing perceptions and values [Kothari, 1995]. All these factors many times results in human-wildlife conflicts in the form of

¹ Ref. [13] points out that negative environmental change leads to various types of conflict in the many developing countries and explains that resource scarcity, made worse by environmental degradation, the inequitable distribution of resources and population growth, leads to poverty, inter-group tensions, institutional collapse and human displacement. These, in turn, lead to instability and conflict.

² The Wild Life Protection Act bans grazing inside national parks assuming that it will damage the ecosystem, but a study conducted by Bombay Natural History Society revealed that buffalo grazing is an integral part of the ecosystem which help to counter the tendency of wetland to turn into grassland [5].

livestock lifting, crop raiding, poaching of wild animals by the hostile people and propels naxalite activities inside the PAs.

Hence, it has been argued that the social, physical and economic well-being of PA dependent peoples should be realized within a holistic conservation effort [14, 15, 16]. Participatory studies have repeatedly shown that local people's support is critical to the successful management of PAs [17, 18, 19, 20, 21]. Local support, embedded in the local acceptance of holistic conservation actions, can be positively influenced through socio-economically beneficial activities such as tourism, alternative employment opportunities, cultural preservation and democratic participation, i.e. making local people essential shareholders in net conservation benefits [22, 23]. Such participative approaches may encourage consensus among academicians and policy makers on effectively managing PAs and enhancing the lives of the millions of people dependent on PAs.

India is one of the mega-biodiversity countries in the world with a heavy reliance on its natural resources for its economic growth. A large part of India's rural and tribal population also directly depends on these natural resources for their subsistence. The official statistics of the government of India indicate that 4.8% of the country's land area is protected for the specific purpose of wildlife conservation [24]. There are currently 661 PAs in the country, which are legally recognized under the Wildlife Protection Act [WLPA 1972, amended 2002] [24].

Most of the PAs in India support various forms of land use, such as agriculture, livestock grazing, collection of fuelwood and other non-timber forest products [NTFPs]. However, the extent of support varies depending upon the type of PAs. A study by [25] showed that more than 20% of the 222 PAs in India were the centre point of physical confrontation and clashes between the local people and the park managers over resource use, at the time. In recent years policy prescriptions have largely been ineffective in achieving genuine participation of people living inside the PAs [25, 26]. As a result many flagship species are getting extinct. However, in some cases wildlife crisis has been witnessed even there is support from the localites, due to ineffective management of the PAs³.

³ In 2005, tigers went totally extinct from Sariska Tiger Reserve even though the reserve had been cited as an example of a tiger

Therefore, with an attempt to analyse the current issues and challenges faced by the PAs towards the effective functioning of participatory management and the avoidance of escalatory conflicts, the present study focuses on the complex interactions of local communities within PAs keeping the geographical scale of the study as the Similipal biosphere reserve [henceforth SBR] in Odisha. The study is based on secondary information collected from SBR, review of literatures published on SBR, and our interactions with both SBR officials as well as local people living in and around SBR during the field visit in July, 2012.

The paper describes the richness of biodiversity, current status, threats and the mode of conservation of the SBR. The paper is divided into five sections. Section 2 presents a brief description of the background on the SBR, its importance and current status. A discussion on the institutional dynamics and management of SBR is presented in section 3. Section 4 presents the analysis of the effectiveness of current management practices in SBR. Section 5 concludes.

Description of the Study Area, Importance and Current Status

The SBR has been selected as the study region owing to its significance within the biodiversity map of India and in Odisha state. The forests constitute 22% of the geographical area out of which 5% of its area falls under PA network [27]. The SBR ($20^{\circ} 17' - 22^{\circ} 34' N$ and $85^{\circ} 40' - 87^{\circ} 10' E$) covers an area of 5569 sq km and is situated in the heart of Mayurbhanj district of Odisha state in India [Figure 1]. Similipal contributes 38% of the total area of the PA network in Odisha [27]. It is the sixth largest biosphere reserve, one of the oldest tiger reserves in the country and a major biodiversity hotspot in Eastern India. Besides, the reserve is included as a part of the World Network of Biosphere Reserves by UNESCO in 2009. It encompasses the Proposed National park [declared in two phases during 1980/1986] and the Wildlife sanctuary (declared in 1979).

An assemblage of ecosystems ranging into the Forests, Grasslands and Wetlands, the composite 'Similipal ecosystem' is the abode of 1076 species of vascular plants representing 170 families of which 64 species are cultivated plants and 96 are orchids [28]. These include 2 species of orchids which are endemic, 8

reserve where there was successful local participation in the conservation of the tiger, and its habitat.

plants species which are endangered, 8 plants species whose status is vulnerable and 34 other rare species of plant. Among 41 species of medicinal plants of Odisha prioritized for conservation action [28], 30 are known to occur in Similipal. SBR is also the abode of the black and melanistic tiger which is rare. The identified species of fauna include 20 species of amphibians, 62 species of reptiles, 304 species of birds and 55 species of mammals, all of which collectively highlight the biodiversity richness of SBR. As a major tiger habitat, it is estimated to have 99 Royal Bengal Tigers and 432 wild elephants [27]. So, SBR contains over 50% of the tiger population and about 25% of elephant population of entire Odisha state [27]. Besides, SBR is an important tourism destination for both the domestic and foreign visitors. Although, Similipal is a rare expression of nature's bounty, many scientific facets are believed to be still unexplored.

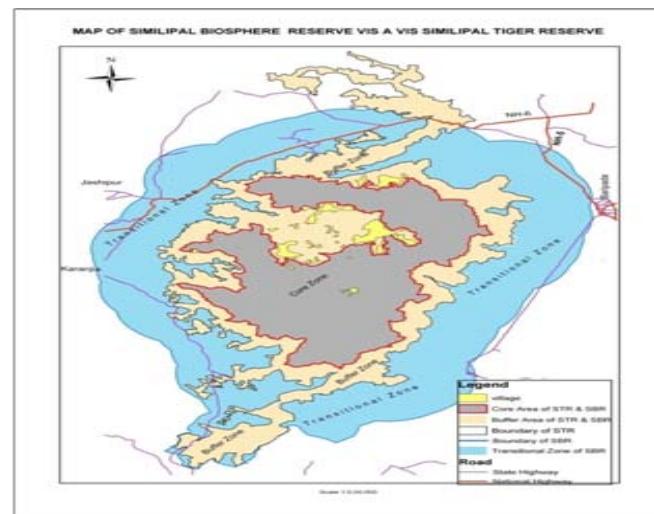


FIG. 1 MAP OF SIMILIPAL BIOSPHERE RESERVE

Besides the rich floral and faunal biodiversity, SBR is also the abode of many tribes like Khadia, Bhatudi, Kolha, Bhumija, Munda, which have a rich culture and totally depend on forests for their livelihoods. The entire Similipal forest area falls under one of the Scheduled V category [tribal sub plan area] of the state as majority of inhabitants are tribal. The tribal population constitutes 73.44% of the total population of the area, while the scheduled castes constitute 5.21% and other backward castes constitute 21.35% respectively [28]. Out of 1265 villages, 65 villages are situated inside the Sanctuary area⁴ of which 61 villages are in the buffer area and remaining 3 villages are in

⁴ The total population of villages located in buffer and core area is 12000 and 449 respectively [28]. In buffer area the percentage of Scheduled tribe is 87% while in core area it is 100% [28].

TABLE 1 KEY THREATS TO BIODIVERSITY IN SBR DUE TO ANTHROPOGENIC FACTORS

Key Threats to Biodiversity	Current Status
Population increase	Total population of SBR has increased two time more than census 1991 that impels more extaction of forest resources
Extraction of forest produce	Forest produce constitute more than 50% of the local household income and fuelwood constitute 100% energy source in SBR [29].
Livestock grazing	Though grazing is prohibited in the core area of Similipal Sanctuary, around 50,000 livestock graze inside the Reserve daily [30]. Even, cattle from up to a distance of 5-7 km from the Reserve boundary also graze inside the reserve [30] which exert pressure on the SBR.
Livestock population	Livestock population of the core area has increase two times within the last ten years [27]. Many times the domestic cattle stray into the tiger habitat for grazing, thus causing the major cases of cattle lifting. Between the year 1990-2000 the total number of cattle killed in such cases was 219 [27]
Wildlife poaching	Poaching of wild animals as a cultural practice, in the name of ' <i>Akhand Shikar</i> ' is common
Human-wildlife conflict	Crop raiding by the elephants is a common event inside the reserve [27] which many times provoke the local people to kill the wild animals. Most of the cases of tiger attack happened between 1973 and 1990 when more than six deaths were reported and, a few persons have been injured or killed by elephant attack [27].
Forest fire	The causes of fire are purely biotic mainly by NTFP collectors, smugglers, poachers and grazers. Between the years 1991–2000, around 100 sq km of forest was burnt due to forest fire [27] and is a major cause of soil erosion and death of ground flora and fauna.
Encroachment of forest land	Around 20% of forest land within the biosphere reserve has been encroached upon by local people for agriculture activities since 1995 [27]

TABLE 2 SOCIO-ECONOMIC AND HUMAN DEVELOPMENT STATUS OF PEOPLE IN AND AROUND SBR

Issues	Current Status
Socio-economic Profile	<ul style="list-style-type: none"> ➢ More than 90% households are coming under BPL category ➢ 60% households have monthly income of Rs. 500, whereas 32% earn Rs. 250 to secure just about two square meals a day ➢ More than 60% households are marginal farmers
Livelihoods	<ul style="list-style-type: none"> ➢ 50% of annual household income comes from forest [NTFPs], 20% from agriculture and rest 30% from wage labor
Food Security	<ul style="list-style-type: none"> ➢ Around 50% households get less than one square meal/day ➢ The staple diet throughout the year is rice and salt ➢ Lack of purchase capacity is a major reason behind malnutrition and dying due to starvation and hunger
Health	<ul style="list-style-type: none"> ➢ Death due to cerebral malaria is quite rampant. During 2006, 21 death of children below 5 years which went up to 37 in 2007 only in the core area ➢ Health centres inside SBR are very less in number and are in a very poor condition ➢ Unavailability of medicine is a frequent case ➢ District health service has provided only two ambulances which charge Rs 5/km to carry the patients to either Jashipur and Baripada [nearest towns] located around an average distance of 40-50 kms
Sanitation	<ul style="list-style-type: none"> ➢ Unhygienic an polluted drinking water leads to various diseases [particularly water related vector borne diseases] like diarrhoea and jaundice ➢ Very few villages have wells and tube wells. Streams and water channels are majorly used both for household chores and drinking purpose
Communication	<ul style="list-style-type: none"> ➢ Poor road connectivity to many villages ➢ No telephone or mobile phone access inside the reserve
Employment	<ul style="list-style-type: none"> ➢ Employment opportunities are very poor as the local people are provided with only 15-30 days of work per year at a nominal wage ➢ About 67% of the population engaged in casual labour while less than 20% cultivate land for subsistence
Others	<ul style="list-style-type: none"> ➢ Inaccessibility to various institutions e.g. bank, post office, schools, and police stations cause maximum hindrance to development ➢ Total literacy rate is less than 50% ➢ Ponds have been constructed in many villages, but are yet to be completed ➢ Solar lights have been provided at certain places which are in defunct state
Source: Ref. [29]	

core area. The communities inhabiting the SBR majorly supplement their consumption and income by extracting plants⁵ and about 50% of them earn a part of or the complete livelihood from Similipal. The intimate association and dependence of the tribal communities on the natural resources have enriched them with invaluable knowledge on the bio-resource utilization [27].

However, since the resident local human population has a strong level of dependence on SBR's resources, the local resource use activities poses a number of challenges to biodiversity conservation in SBR. The specific challenges are: the loss of diversity due to collection of small timber and fire-wood; the loss of diversity due to forest fire and the loss of diversity due to *shikar* (illegal Hunting of wildlife). '*Akhand Shikar*'⁶ is considered to be one singular custom that results in large-scale killing of wild animals. Moreover, the frequent attacks from Maoist militias and increasing human-wildlife conflicts in the form of crop damage and livestock losses increase the life risks and conservation challenges faced by the conservation institutions. However, the key threats to biodiversity in the SBR is summed up in the below table.

In addition to the threat posed to biodiversity, the local livelihood in Similipal is also under pressure. Since, human habitation in and around the protected areas lives in subsistence economy with little or no access to market, education, health and other sanitation services, which generally results in low human development indicators such as high infant mortality, below average longevity, etc. As a consequence of this people try to improve their living standards by extracting more resources from the PAs that again results in serious implications on conservation of biodiversity and natural habitats. The common livelihood issues faced by the local communities inside the SBR are summed up as follows:

The above tables clearly depict that SBR is a backward performing tribal region in terms of many development and welfare indicators. Therefore, effective management of the SBR towards biodiversity

⁵ Major extracted forest products are Honey, Gum, Arrowroot, Wild Mushrooms, flowers and seeds of *Mahua* and *Sal* seeds.

⁶ Tribal people in and around Similipal indulge in '*Akhand Shikar*' (mass hunting) as a ritual. Earlier practiced during mid-April, now this occurs throughout the year, barring the monsoon period. Previously the people simply killed, burnt and ate inside the forest, but presently consumerism and commercialism have encouraged them to sell the killed animals in the markets at the foothills.

conservation as well as livelihood improvement has become imperative, both by the federal/state government and local institution.

Institutional Dynamics and Management of SBR

The agreement on what constitutes an effective and sustainable forest management is still a debatable issue. However, effective conservation of biodiversity in any PA is incomplete without proper management initiatives [8, 31]. The components of management include creating new livelihood opportunity for the forest-dependent people, empowering local people, ensuring representation and equity, strengthening resource security or providing property rights and broad-based participation in decision making [1].

The responses from both Federal and the state governments to the threats of the depletion of biodiversity especially to the wildlife, has led to the completion of many projects for conservation of wildlife in SBR. 'Project Tiger', a major conservation initiative of the government of India, was launched in 1973 to save the Indian tiger from extinction. Similipal tiger reserve was one of the nine such reserves chosen in the country for launching the Project Tiger. The Indian Wildlife (Protection) Act, 1972 was promulgated in the state in August 1974, and a separate wildlife wing within the state forest department was created in June 1976. Again, the 'Project Elephant' as a conservation strategy for elephant and its habitat was launched in 1992 and over 7000 sq.km of Similipal area was added to it. Besides, the Mugger Crocodile Project was introduced in Ramtirtha area of Similipal to give protection to the endangered Crocodiles. Besides, towards local livelihood improvement, all the households in and around SBR are registered for getting employment for 100 days in a year under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) scheme.

Odisha is known for effective community forest management. A variety of local institutions are found in and around SBR that are designed to promote conservation of biodiversity and local livelihoods (Table 1). The Government of Odisha, through its Joint Forest Management (JFM) Resolution (2008), has adopted eco-development as a strategy for securing support from local communities in PA management.

TABLE 3 VILLAGE LEVEL INSTITUTIONS FUNCTIONING IN AND AROUND SBR

Nature of Institutions	Name of Institutions	Number	Functioning / Role
Formal Institutions	Eco-development Committees (EDC)	343	Work for village eco-development [provider of community welfare and alternative income generation activities]
	Vana Surakhya Samiti (VSS-Forest Protection Committees)	681	Protection of forest and wildlife management, control against illegal cutting of trees and forest fires
	Sabuja Vahini (Green Brigade)	57 (496 member)	Protection of forest and wildlife, detect forest offences, control against 'Akhand Shikar', illegal cutting of trees and forest fires
	Fire Groups		Control against frequent forest fires
	Protected Area (PA) Managers		Local units of forest department- Protection of forest and wildlife
Informal Institutions	Tiger Protection Camps	94	Protect tigers
	Vaidya Sangha [Committee of Traditional Healers]	3	Promote local health traditions and conservation of medicinal plants
	Village Forest Committee (VFC)		Protect surrounding forest of the village from illicit felling of trees, control against timber smuggling
	Self Help Groups (SHGs)	273	Provide alternative employment opportunity and conduct community welfare programmes
	Aganwadi		In-charge of mid-day meal at schools, organize child welfare and health programs
	Asha Karmi		Health workers appointed in villages (take care of women at the time of pregnancy)

Source: Office of the Regional Chief Conservator of Forests and Field Director, Similipal Tiger Reserve, Baripada, Mayurbhanj, Odisha

Eco-development Committees (EDCs) along the lines of Vana Surakhya Samiti (VSS) provide a strong linkage between conservation and development; and they may include ecotourism and off-farm activities, as well as providing specific alternatives to local biomass dependence. The following village level institutions (both formal and informal) are found in and around the SBR having the overall objective of biodiversity conservation and community development.

However, there is a local committee chaired by the Director, SBR and comprising of district level officers of various related departments and also two NGOs of Mayurbhanj district, which deliberate from time to time to formulate suitable action programmes. Besides, many protection strategies have been implemented and funds have been invested towards the protection of SBR during 2009-11. The major investment has been in construction of 36 numbers of water harvesting structures and improvement of irrigation channels to fields. Sabai rope making units and sal-leaf plate making units have been supplied to the villagers. Health camps, anti-malaria campaign, immunization of people and cattle have been carried out. The facility of revolving fund for micro-credit has been extended to selected community groups. Training in sericulture, *Sabai* rope making, improved agricultural technique, bee keeping, and orchid growing and in the job of eco-guide, etc. have been imparted to 112 persons. Some other important activities includes: joint patrolling conducted by the staff of Similipal Tiger Reserve (henceforth ST) and Territorial divisions, the deployment of captive elephants in protection duty, the deployment of Sabuja Vahini (Green Brigade) in the sensitive pockets of the Tiger Reserve, and developing an intelligence network in the villages inside the reserve to tap information regarding the movement of poachers or timber smugglers in the STR. Some efforts are being directed toward wildlife education, awareness, research and training of the common people by the different government organizations and NGOs.

Although some changes have been noticed⁷, the role

⁷ During the year 2005-06, the mass hunting rate (*Akhand Shikar*) was quite low because of a protection force comprising of ex-army personals and *Sabuja Vahini* volunteers. Illegal cutting of trees and cases of forest fires has been reduced because of the involvement of VSS, EDCs and the Green Brigades volunteers. During 2007-08, out of total offences recorded in the core area, 79% were detected by the *Sabuja Vahini* volunteers alone.

and efficacy of these local institutions towards biodiversity conservation and local livelihood improvement in and around the SBR has been found to be ineffective and inadequate.

Current Management Issues and Challenges

It is often assumed that all the members of a community must be equally benefited, if the community is to develop effective resource management institutions [27]. Despite the provision of benefit sharing⁸, the sharing provisions are questioned on various counts. Again, the benefits derived from the establishment of local village level committees are doubtful in terms of its sustainability in the long term [32].

One of the major constraints with the Village Forest Committee (VFC) is their limited relationship with State Forest Department, since it has not got the legal and statutory status. Due to their limited recognition, VFC finds difficulty to manage resources in long-term forest development perspective.

The Sabuja Vahini is still in a primitive stage of their activities and a formal institutionalization is yet to be done. However, they are covered under the JFM scheme since the authorities believe that a new institution created outside the JMF arrangement would increase difficulties. At the same time, there is almost no scope for benefit sharing. Further, the issue that in the JFM, the poor protect the natural resources, and there is no scope to develop a sense of ownership on it appears to be very critical. A study by [33] indicate that in the JFM model of management, the forest-dependent poor only protects the natural resources and there is no scope to develop a sense of ownership over the resource. Most of the EDCs are defunct due to the lack of funds, awareness, knowledge and dissemination of information. Since there is only one Aganwadi Centre for every 1000 population and the number of staffs are few, during the rainy season the Aganwadi workers face a lot of problem for immunization, taking care of antenatal women, attending emergency cases, supplying Aganwadi food, monitoring weight of kids.

Again, gender sensitization is one of the major concerns in the management of forest resources concerning women's participation, equalization and

⁸ Under the 1993 Resolution there should be 50% sharing of the produce/income from a 'major' or 'final' harvest of timber between the FD and members of VSSs.

their involvement in various community and economic activities. Women and girl children particularly from low caste/poor tribal families collect firewood, fodder, small timber, various NTFPs etc. from the forest. But, they are least empowered, neglected and increasingly alienated ⁹ from participation in decision-making forums. Therefore, lack of participatory of process still remains in the planning, implementation, monitoring and evaluation of management programmes in the SBR.

Besides, many times the destruction of natural resources and the resultant biodiversity loss inside the PAs is strongly attributed to a lack of a well defined and secure system of property rights¹⁰ [34, 35, 8]. Therefore, the concept of co-management or collective action by local institutions where both the state and local communities have some rights and responsibilities over the resources, have been widely accepted [18, 19]. However, the local communities inside SBR are mostly unaware about property rights over the forest resources that many times results in loss of biodiversity as well as livelihoods¹¹. The local institutions functioning inside SBR

Again, though eco-tourism in Simlipal has the potential to generate substantial revenue, required to finance conservation related projects as well as enhance local livelihood opportunity, the same has not been adequately explored. However, the three and a half decades of conservation efforts under Project Tiger suffered a major setback due to a series of attacks carried out by suspected left wing extremists between 28th March 2009 and 15th April 2009. These attacks resulted in a complete breakdown of extensive damage to vital reserve management infrastructure including range and beat offices, anti poaching camps, communication networks, and also, to the morale of reserve staff and property. Since then most staff positions inside the SBR has been remain vacant.

On an average one Forest Guard looks after 20 km² of the forest area which is quite large. Because of large scale vacancies in the level of Forest Guard and Forester, a Forest Guard remains in charge of two to

⁹ Under some EDCs, women are engaged in firewood head loading, primary processing of NTFPs at the household level such as leaf plate making, beedi rolling, broom/mat making etc. but, the number is very less.

¹⁰ Property rights are defined as the legal expression of the guarantee of access to a benefit stream in the context of a given legal, political and social order [36].

¹¹ Lack of knowledge on ownership, use of land and application of modern technology result in low productivity of agriculture in SBR.

TABLE 4 CURRENT DETAILS OF STAFF AND VACANCY OF POSTS IN SBR

Area	Sanctioned Strength	Staff in Position	Vacant	% Vacant
Core	145	90	55	38
Buffer	104	94	10	10
Total	249	184	65	25

Source: Evaluation reports of Tiger Reserves in India, Project Tiger Directorate, Ministry of Environment and Forests, Government of India

three beats (approximately an area of over 50km²). The savage Maoist attack has also not only poses a threat to biodiversity but also affects the government revenue earned from wildlife tourism¹². It shows that the Forest Department of SBR is severely short to protect the rich biodiversity in Simlipal.

All these issues have severely hampered effective management of the reserve and pose a serious challenge towards biodiversity conservation as well as maintaining pace with the local communities.

Conclusion

In this study we have made an attempt to understand the complex issues and management challenges faced by the SBR. It is found that the rich resource-full SBR is under serious threat. Both the government policies and local village level institutions have failed in a large way to conserve biodiversity as well as promote local livelihoods. Eco-tourism, which is highly neglected inside Simlipal, should be promoted and get utmost attention because it may serve as a panacea to curb local livelihood problems. Filling up of staff vacancies is very crucial towards conservation of biodiversity inside SBR. There is an urgent need for a lot of capacity building training activities to raise the skill and capabilities of these stakeholders. Organization of nature and wildlife awareness camps, campaigning against 'Akhand Shikar' and various orientation programmes on ecotourism activities by the local institutions are necessitated. Though the process of empowerment is a long and backbreaking task, it is suggested that the implementation of better participatory programmes through these institutions will not only strengthen empowerment process but also redesign these grass root institutions more

¹² Tourist inflow into SBR had nosedived from 20,743 in 2008-09 to 9,712 in 2010-11 which had its impact on tourism revenue; from a record of Rs.26, 98,952 in 2008-09 to Rs 6, 84,020 during 2010-11.

people-centred. But, whether the strategies taken by these grass root level institutions are adequately directed to promote the livelihood interests of the primary gatherers and to preserve rich biodiversity is a moot point.

References

- G. Shahabuddin, and M. Rao, "Do community-conserved areas effectively conserve biological diversity? Global insights and the Indian context," *Biological conservation*, vol. 143, pp. 2926-2936, 2010.
- P. M. Vitousek, H. A. Mooney, J. Lubchenco, and J. M. Melillo, "Human domination of earth's ecosystems," *Science*, vol. 277(5325), pp. 494-499, 1997.
- S. L. Pimm, *The World according to Pimm: A scientist audits the earth*, New York, USA: McGraw Hill, 2001.
- S. L. Pimm, G. J. Russell, J. L. Gittleman, and T. M. Brooks, "The future of biodiversity," *Science*, vol. 269 (5222), pp. 347-350, 1995.
- A. Kothari, S. Suri and N. Singh, Conservation in India: a new direction, *Economic and Political Weekly*, vol. 30(43), pp. 2755-2766, 1995.
- M. M. Cernea, *Risks, Safeguards, and Reconstruction: A Model for Population Displacement and Resettlement*, M.M. Cernea and C. McDowell, Ed. Washington DC, USA: The World Bank, 2000.
- R. Neumann, and G.E. Machlis, "Land use and threats to parks in the neotropics," *Environmental Conservation*, vol. 16(3), pp. 13-18, 1989.
- R. Heltberg, "Determinants and impact of local institutions for common resource management," *Environment and Development Economics*, vol. 6(2), pp. 183-208, 2001.
- A. Agrawal, and K. Redford, "Conservation and displacement: an overview," *Conservation and Society*, vol. 7(1), pp. 1-10, 2009.
- M. Dowie, "Conservation refugees: when protecting nature means kicking people out, *Orion*, pp. 16-27, Nov. 2005.
- C.C. Geisler, "Endangered humans: how global land conservation efforts are creating a growing class of invisible refugees," *Foreign Policy* vol. 130, pp. 80-81, 2002.
- S. Stevens, *Conservation through Survival: Indigenous Peoples and Protected Areas*, Washington, DC: Island Press, 1997.

T. Homer-Dixon, *Thresholds of Turmoil: Environmental Scarcities and Violent Conflict*, D. Deudney and R. Matthew, Ed. Albany, New York: State University NY Press, 1999

E. W. Sanderson, M. Jaiteh, M. A. Levy, K. H. Redford, A.V. Wannebo and G. Woolmer, "The human footprint and the last of the wild," *Bioscience*, vol. 52(10), pp. 891–904, 2002.

S. Sanderson, "Poverty and conservation: the new century's peasant question," *World Development*, vol. 33(2), pp. 323–332, 2005.

K. Redford, and E. Fearn, "Protected areas and human livelihoods," Wildlife Conservation society, New York, USA, Working Paper No. 32, 130-134, December 2007.

R. Wade, *Village Republics: Economic Conditions for Collective Action in South India*. Cambridge: Cambridge University Press, 1988.

E. Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge: Cambridge University Press, 1990.

J. M. Baland and J. P. Platteau, *Halting Degradation of Natural Resources. Is There a Role for Rural Communities?* Oxford: Clarendon Press, 1996.

S. Bashir, "Land use conflicts in Indian protected areas: The case of Wayanad wildlife sanctuary," Ph.D. thesis Cambridge University, 2000.

B. Behera, "Explaining the performance of state: community joint forest management in India," *Ecological Economics*, vol. 69(1), pp. 177 –185, 2009.

N. U. Sekhar, "Local people's attitudes towards conservation and wildlife tourism around Sariska tiger reserve, India," *Journal of Environmental Management*, vol. 69(4), pp. 339–347, 2003.

B. Macura et al., "Local community attitudes toward forests outside protected areas in India: impact of legal awareness, trust, and participation," *Ecology and Society*, vol. 16(3), pp. 1-10, 2011.

M. Menon, K. Kohil, and V. Samdariya, "Diversion of protected areas: Role of the wildlife board," *Economic & Political Weekly*, vol. 26(27), pp. 18-21, 2010.

V. Saberwal, M. Rangarajan and A. Kothari, *People, Parks and Wildlife: Towards Co-existence*, New Delhi: Orient Longman, 2001.

P. Sawhney, *People-park Interaction: A Case of Bandhavgarh National Park, India*, University of Bonn, Germany: Cuvillier, 2003.

S. D. Rout, "Anthropogenic threats and biodiversity conservation in Simlipal Biosphere Reserve, Orissa, India," *Tiger paper*, vol. 35(3), pp. 22-26, 2008.

B. K. Mishra, "Conservation and management effectiveness of Simlipal Biosphere Reserve, Orissa, India," *The Indian Forester*, vol. 136(10), 1310-1326, 2010.

Vasundhara, "Impact of conservation policies (Specific focus on NTFP ban order by Supreme Court) on lives and livelihood of local people living in and around the protected areas," Rep. 1-53, 2006.

L. A. K. Singh, "Wildlife wealth of Simlipal: a glimpse", *Workshop Journal, District Environmental Society, Mayurbhanj, Orissa, India*, pp. 38-41, 1998.

C. Kumar, "Whither 'community-Based' conservation, *Economic and Political Weekly*, vol. 41(52), pp. 5313–5320, 2006.

B. Rath, and P. C. Sutar, "Human issues in protected areas: a case study in Simlipal Tiger Reserve," *Studies in Protected Areas*, pp. 1-33, March 2004.

R.M. Mallik, "Impact of NTFP-policies on sustainable livelihood of forest-dependent communities in Orissa: An empirical exercise," Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar, mimeo 2000.

D. W. Pearce and J. J. Warford, *World without End: Economics, Environment and Sustainable Development*, New York: Oxford University Press, 1993.

T. Tietenberg, *Environmental Economics and Policy*, New York: Harper Collins College, 1994.

J. Gerber, "Institutional resource regimes: towards sustainability through the combination of property-rights theory and policy analysis," *Ecological Economics*, vol. 68(3), pp. 798–809, 2009.